2006 NE Expo Wheat Field Day

Cooperator:
WHITE HAT SEED FARM
102 White Hat Road
Hertford, NC 27944

Courtesy Of:

Perquimans County – Lewis Smith
Pasquotank County – Al Wood
Currituck County – Tommy Grandy
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The data and written material in this publication were complied and summarized by Dr. Randy Weisz and Dr. Ron Heiniger.

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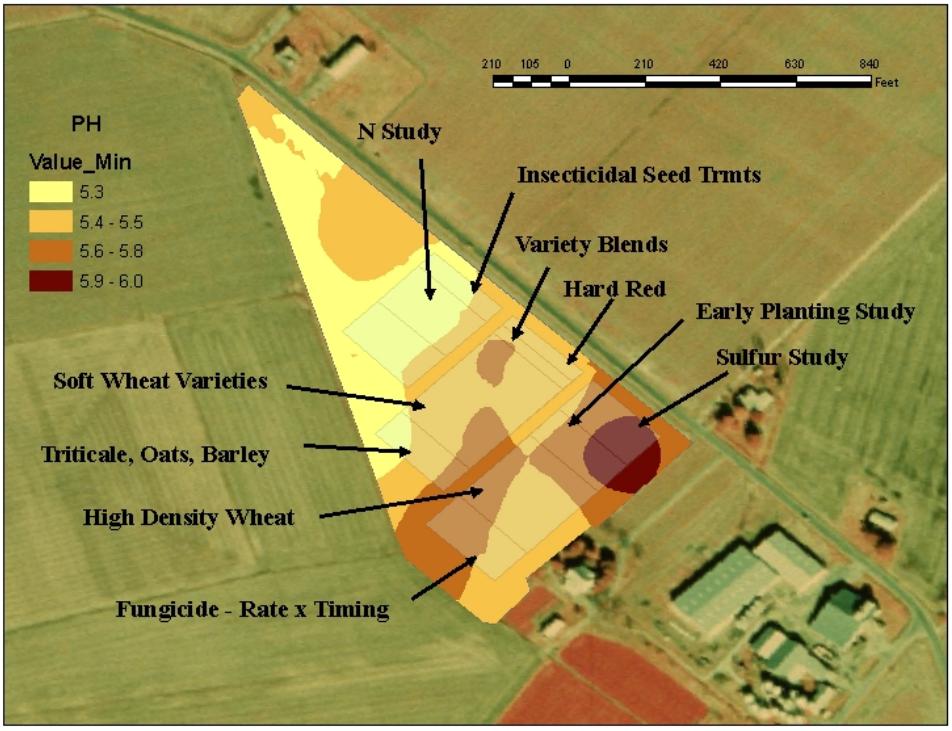
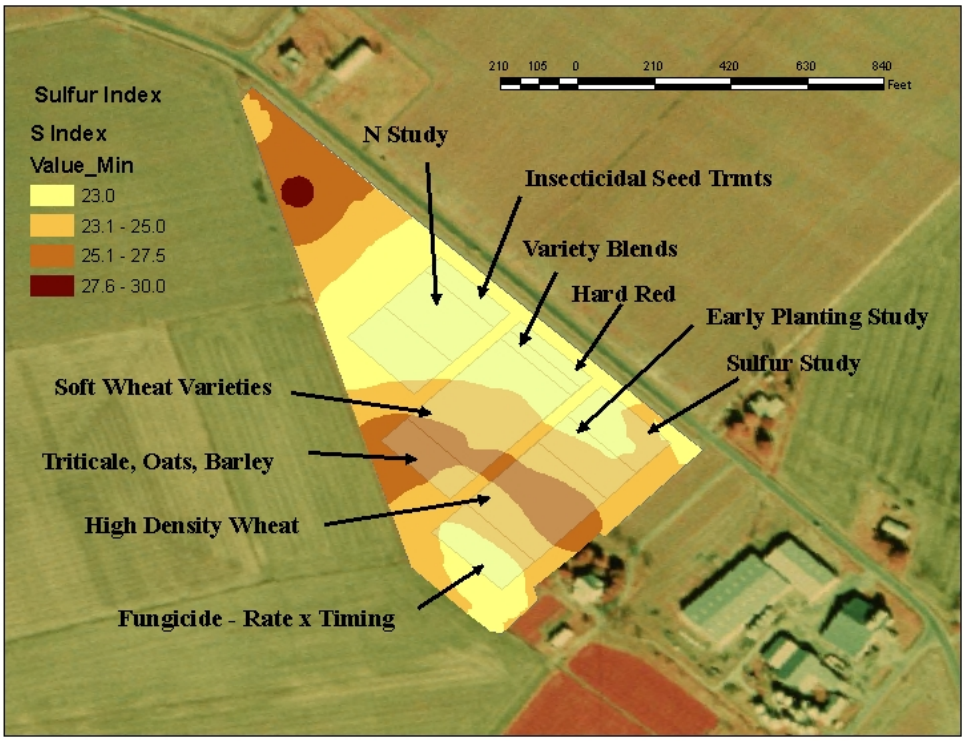
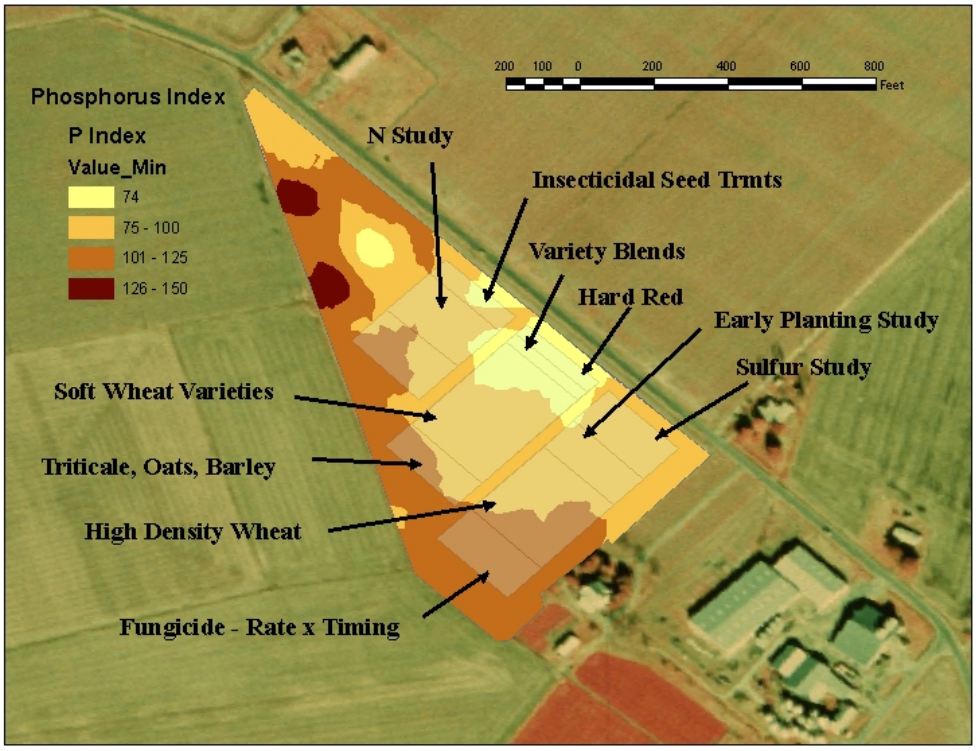


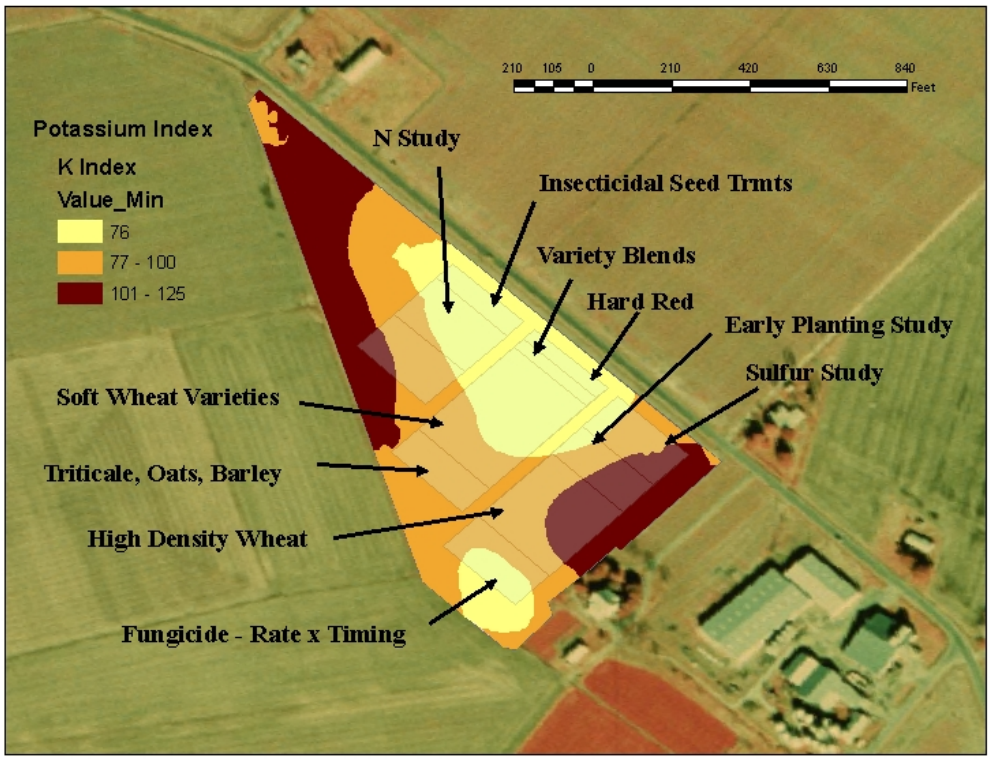
Variability in pH in the field at White Hat Seed Farm



Variability in sulfur in the field at White Hat Seed Farm



Variability in Phosphorus in the field at White Hat Seed Farm



Variability in Potassium in the field at White Hat Seed Farm

Test 1: Variety Test Results

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 19, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 28 seeds per row foot

Introduction

Variety selection is one of the most important decisions a grower makes. There are two factors that must be considered when selecting wheat varieties for Northeastern North Carolina: Yield and Pest Resistance. This test gives growers in the Northeast a measure of the yield potential of wheat varieties available in this area. Table 1 shows yield, test weight, and moisture rankings for the variety test at the White Hat Seed Farm. The symbols indicate the varieties that were statistically no different from the highest ranking variety in each category. Growers should always use varieties that are above the average (note the average yield in this test was 84.2 bu per acre). Several of the varieties at the top of this test are also ranked at the top of other tests conducted across North Carolina (see OVT results).

Test 2: Variety Blends Test

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 20, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 28 seeds per row foot

Introduction

Recently blends of two or more soft wheat varieties have been found to reduce the damage from disease and to maintain yield potential. Three of these blends were tested at White Hat Seed Farm in 2006 with the results shown in Table 1. Comparisons of these blends with conventional varieties should not be based on yield alone but on the ability of the blend to resist disease infestation.

Tests 3 and 4: Hard Wheat and Other Small Grain Variety Tests

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 19, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: Recommended

Introduction

Different types of small grains are available that would offer potential profits to growers. Hard red winter wheat varieties are being introduced in this area for use in the milling and baking of bread. If these hard red varieties would produce competitive yields then the price premium would make this type of wheat viable in this area. Also, triticale, oats, and barley are traditional small grains that are gaining popularity for markets including equine feed and ethanol. Table 1 shows the yield results from these alternative small grains compared to the yield results from the soft red winter wheat varieties.

Table1. Small Grain Variety Trial Results For The NorthEast Ag. Expo.

Variety	Yield (bu/acre)	Test Wt. (lb/bu)
Wheat Variety Trial		
C 9663	94.8*	59.9
Cooper	95.6*	60.7
SS 8309	94.8*	59.7
P 26R12	91.1*	60.7
SS 8302	90.1*	60.9
Panola	88.8*	59.9
McCormick	88.2*	62.0
P 26R24	87.5*	60.6
SS 550	86.4*	61.4
SS 8404	86.4*	61.5
USG 3209	86.2*	61.0
C 9436	86.1*	59.2
C 9312	85.1*	61.1
SS 8308	85.0*	61.8
P 26R61	84.9*	61.9
NC-Neuse	84.8*	61.7
C 9184	82.7	62.8†
P 26R31	82.5	60.4
P 25R15	81.6	60.1
V-Mcintosh	81.6	61.1
V-Tribute	81.5	62.6†
Roane	81.5	61.9
USG 3592	80.6	61.4
C 9511	78.4	62.1
SS 535	77.8	61.1
SS MVP 57	77.3	59.3
SS 560	77.0	60.0
SS 520	76.4	59.9
Crawford	76.2	60.8
SS 566	75.1	60.5
Mean	84.2	60.9
Variety Blends Trial		
V-Tribute & Roane	82.5*	58.5†
AGS 2000 & USG 3209	75.3	55.6
NC-Neuse & USG 3592	72.9	50.7
Mean	76.9	54.9
Hard Red Wheat Trial		
TAM 302	76.0	57.7
Oat Variety Trial		
C 4052	88.0*	35.9†
Brooks	80.1*	35.9†
Rogers	77.0*	34.5
Barley Variety Trial		
Price	126.9*	49.7†
Boone	106.9	48.7
Tritcale Variety Trial		
Trical 308	90.3*	46.5†
Trical 498	86.4*	45.7†

* These varieties are not significantly different from the highest yielding variety.
† These varieties have test weights not different from the highest test weight variety.

Conclusions

The following table shows varieties grouped by statewide yield potential. Growers should consider this information along with the results of the test at White Hat when making their decision. For instance, Southern States 8308 is listed a consistently above average in the table below. It also was in the upper rankings of the test at the White Hat Seed Farm. Similar

observations can be made about Panola, P 26R12, SS8302, and USG3209. Growers should also consider the pest resistance information in picking the right variety for their farm. The table below lists current resistance ratings.

Wheat Variety[1]	Heading Date	Pest Resistance To:								
		Powdery Mildew	Leaf Rust	SNB[2]	Hessian Fly Type-L	Barley Yellow Dwarf	Soilborne Wheat Mosaic	Wheat Spindle Streak	Head Scab	Stripe Rust
Consistently Above Average Yielding Varieties										
AGS 2000	early	MS[3]	MR	S	Good/Fair	Good/Fair	S	MS	MR	MS
Pioneer 26R24	medium	S	S	MS	Fair/Poor	Fair/Poor	MR	MR	S	S
Pioneer 26R31	medium	R	S				MR			
SS 8308	medium	R	S	MS			R			
USG 3592	medium	MS	R	MR	Poor		MR	R	S	MS
V-McIntosh	medium	MS	MR				MR			
Above Average Yielding But Less Consistent Varieties										
Panola	med-early	MR	S	S			MR	MS		
Pioneer 26R12	late	MR	S	MR	Good	Fair/Poor	MR	R	MS	MS
SS 520	early	MR	MS	MS	Poor	Good	MR	R	MS	S
SS 8302	late	S	S	MS	Fair		MR		MR	R
USG 3209	med-early	MR	S	MS	Fair	Fair	R	R	MS	MR
Average Yielding Varieties										
Coker 9312	med-early	S	MR	MR	Good		R	R	MR	MS
Coker 9436	late	MR	MS				MR			
Featherstone 176	med-early	R	S				MS			
NC-Neuse	late	R	MR	MR	Good	Fair/Poor	R	MS	MR	MS
Pioneer 26R15	late	MR	MR	MS	Good		MR	R	MR	MR
SS 560	medium	MR	S	MS	Fair		MS	R	MS	MS
SS MPV 57	medium	MS	S	S			R			
V-Tribute	medium	R	MR	MR	Fair	Good/Fair	S	MR	MR	MS
Below Average Yielding Varieties										
Coker 9184	late	MS	MS	MR	Poor	Fair/Poor	MR	R	MS	MS
Coker 9511	med-early		R							
McCormick	medium	R	S	MS	Fair		MR	R	MR	MS
Renwood 3260	medium	R	MS	MR			R	MR		
Roane	late	S	S	MS	Good	Good	MS	R	MR	MS
SS 8309	late	MR	S	S	Poor		S		MR	S
USG 3137	late	MS	MR				S			

1. Listed alphabetically within each yield performance group
2. SNB stands for Stagonospora Leaf and Glume Blotch
3. S, MS, MR, & R stand for Susceptible, Moderately Susceptible, Moderately Resistant, & Resistant respectively

Test 5: Early Planting - Seeding Rate Trail Results

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 18, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 8.4, 11, 16 seeds per row foot

Introduction

The idea behind this trial is that growers using no-till practices or growers with wet soils may benefit from planting early at a reduced seeding rate. Previous work on early planting found that there is a danger of Hessian fly, fall infestations of powdery mildew or barley yellow dwarf, and potential damage from an early spring freeze. Recent advances in fungicidal and insecticidal seed treatments and an improved understanding of daylength sensitivity in wheat varieties provides solutions to these problems. This test looked at several varieties with varying degrees of daylength sensitivity all treated with Baytan™ and Gaucho™ seed treatments and the use of low seeding rates to reduce the potential for pest infestation. While the planting date of Oct. 18 would not be considered an "early" planting, it does give us an idea of how wheat yield will respond using these management practices. Figure 1 shows the results of the four varieties used in this study.

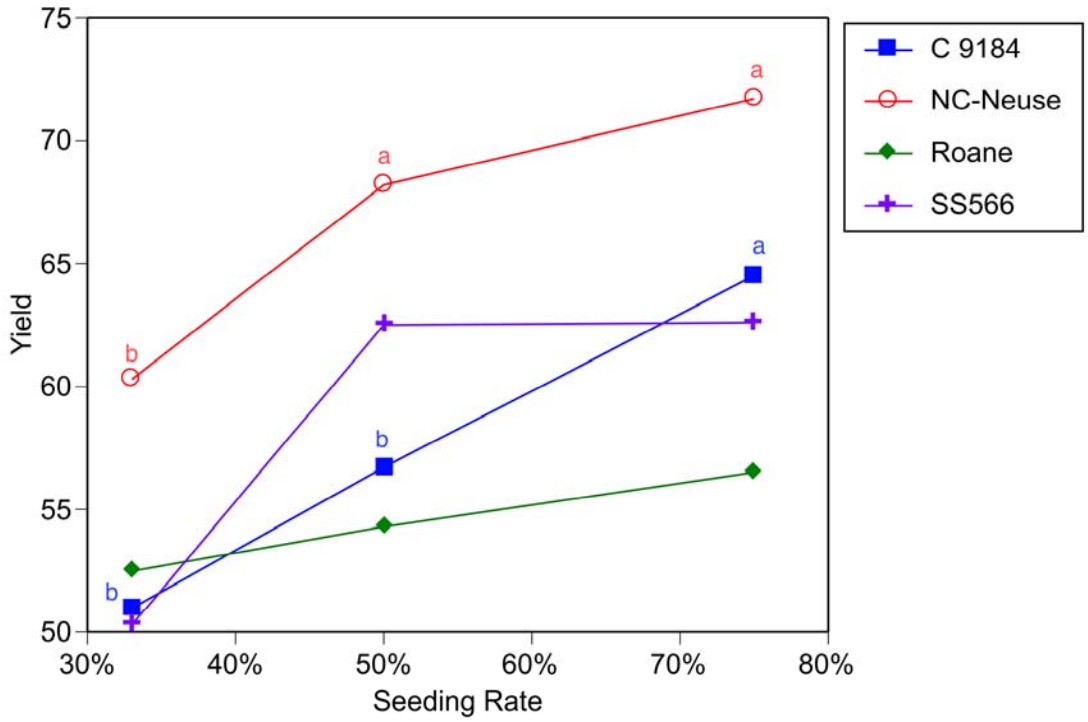


Fig. 1. Yield response to three seeding rates (8.4, 11, and 16 seeds per row ft) for four different varieties at White Hat Seed Farm. Significant differences are noted by the letters beside each symbol.

Conclusions

Neither disease nor insect pressure was a factor in this study. Furthermore, this site was not impacted by early freeze damage. Therefore, the key observations for this study are the individual variety responses to increasing seeding rates. Roane was the only variety that did

not have a significant response to seeding rate. This was mainly the result of lower yield at 11 and 16 seeds per row ft when compared to the other varieties. Coker 9184 showed the strongest response to increasing seeding rate, but NC-Neuse had the highest yields at each of the three seeding rates. Overall, this study shows that growers planting during this period in October should not plant at the lower seeding rates. However, this does not preclude reducing seeding rates when planting earlier. Further studies are being conducted to look at earlier planting periods.

Test 6: High Density Wheat Results

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 20 and Dec 9 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 25 and 60 seeds per row foot
Variety: Pioneer 26R12

Introduction

Stand or tiller density at the start of jointing (GS30) is critical to obtaining high yield in spring wheat. Past research has focused on developing tillers by adding nitrogen in the fall or early spring, but both of these strategies have drawbacks. In European cropping systems the grower seeds wheat at very high densities to obtain the desired tiller number. This system may allow growers in North Carolina to achieve consistent stands and higher yields from year-to-year by guaranteeing tiller density. This study examined two seeding rates (25 and 60 seeds per row foot) planted on two dates (Oct 20 and Dec 9) to determine the impact of high density wheat on tiller number and yield. In addition, starter N, fungicidal seed treatments, and fungicides applied at heading were varied to determine if increasing tiller density would require other adjustments in management. Figures 2 and 3 show the impact of seeding density on tiller number and yield.

Conclusions

Unfortunately, cool-wet weather following the Dec 9 seeding resulted in poor stands at both seeding densities with yields for all treatments below 10 bu per acre. Therefore, only the results from the first planting date are presented. The higher seeding rate achieved 60 tillers per square foot at GS30 regardless of whether N was or was not applied at planting (Fig. 2). At the lower seeding rate 60 tillers per square foot was only achieved by applying 30 lbs of N per acre at planting. These results are similar to those obtained in 2005 and in Beaufort County in 2006 and indicate that higher seeding rates will result in more consistent tiller numbers at GS30. Despite indications of more consistent tiller numbers the different seeding rates did not result in yield differences (Fig. 3). None of the management factors tested, seeding rates, N, or seed treatments significantly increased yield compared to the treatment using 25 seeds per row foot with no N or seed treatment applied. The fall weather in 2005 was ideal for wheat growth and development and since this planting date was early enough to take advantage of the weather the slight differences in tiller number did not adversely affect yield. Figure 4 shows the overall impact of seeding rate on wheat yield. We were able to measure this by combining the data from the Early Planting-Seeding Rate Trial with this High Density Trial. This figure shows that as seeding rates increase to 28 seeds per row foot yield increases. However, further increases in seeding rate do no result in a corresponding

yield increase. Growers should use this information to adjust seeding rates to maximize tiller development while controlling the cost of seed.

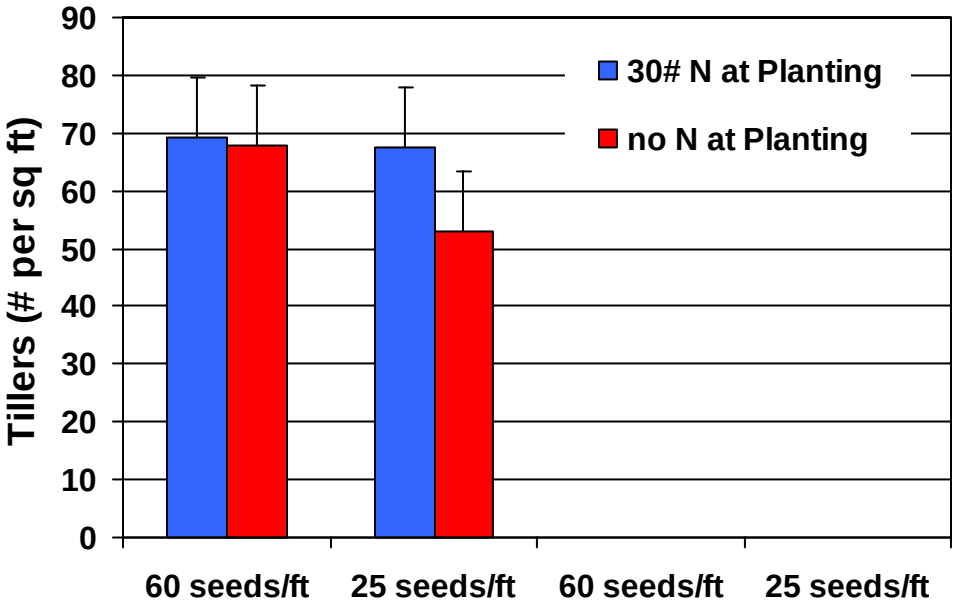


Fig 2. Changes in tiller density measured at GS30 resulting from differences in seeding rate and the amount of N applied at planting. Error bars represent significant differences at P<0.05.

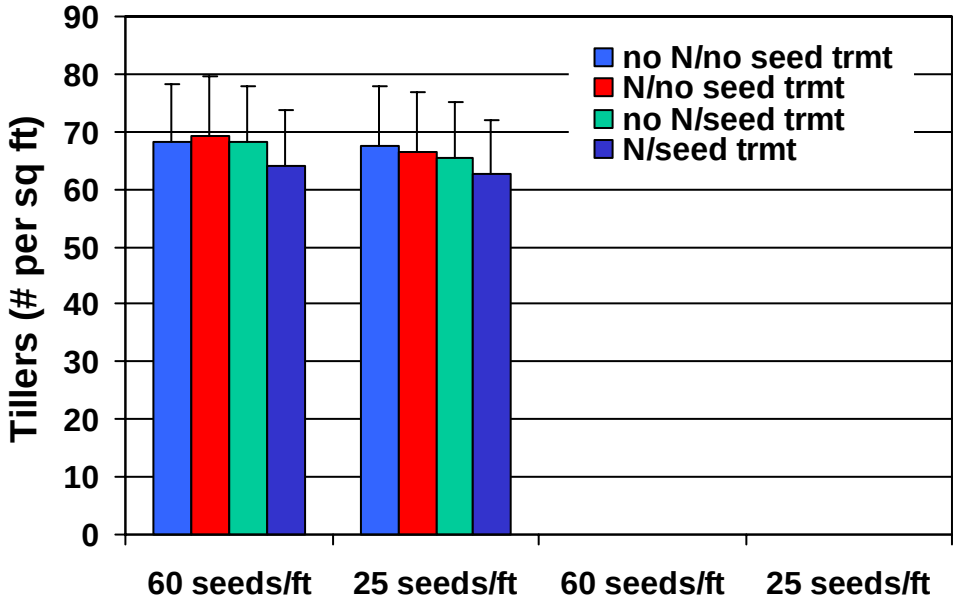


Fig. 3. Response of grain yield to changes in seeding density and N applied at planting. Error bars represent significance at p<0.05.

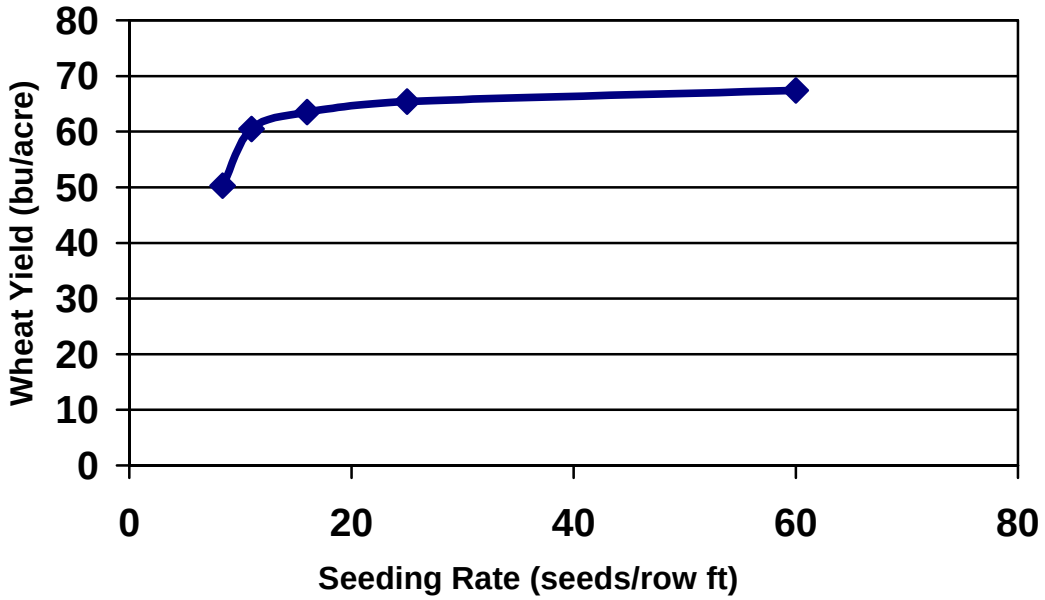


Fig. 4. Response of wheat yield to increases in seeding rate at the field site at White Hat Seed Farm in 2006.

Test 7: Fungicide Application Trial

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 20, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 28 seeds per row foot
Variety: Coker 9804

Introduction

The high humidity and moisture that characterizes the climate of Northeastern North Carolina often leads to disease infestation of small grains. Fungicides are available that have the ability to control most of the major diseases of small grains. However, it is often difficult to determine when to use a fungicide since wet weather may make it difficult to get a fungicide applied in a timely manner and many of the fungicides are not labeled for use after the heading stage. This study was designed to test the application of fungicides at two different stages of development (boot stage and post flowering), as well as a split application, to determine if these materials would increase yield. In this case the early fungicide application occurred on April 28 when the head was just emerging from the boot and the late application was made on May 10 after flowering had taken place. Four different fungicides (Tilt, Headline, Stratego, Quilt, and Quadris) and an untreated check were used. Figure 5 shows the results of this test.

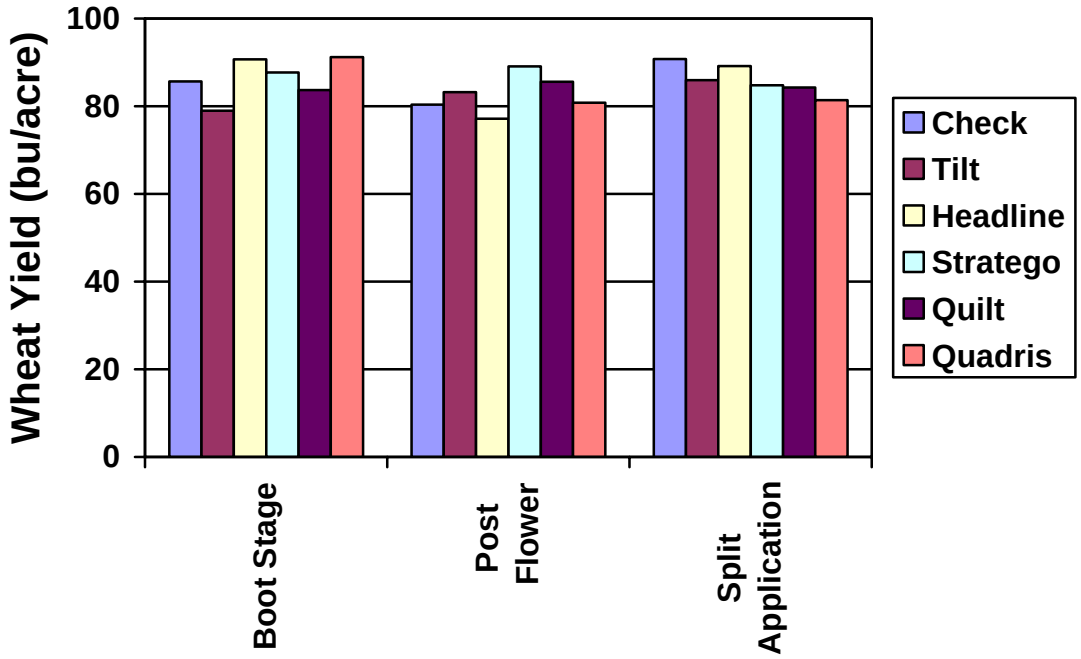


Fig. 5. Yield response to fungicide treatments applied at boot stage, post flowering, or in a split application. No significant differences were found among any of the treatments or timings.

Conclusions

Disease ratings indicated that there was not a significant amount of disease infestation present in this study. Therefore, it should be no surprise that none of the treatments applied at either of the two periods or split applied at both periods resulted in increased yield. This study points out the difficulty in making a decision about whether or not to apply a fungicide. When disease is not present there is no yield advantage to a fungicide application resulting in a loss of income due to the cost of the application. However, when disease is present previous studies have found significant yield increases that more than covered the cost of the application. Growers must know the history of disease infestation in their area use factors such as the density of the wheat canopy and the likelihood of weather favoring the disease to determine their risk of having significant disease pressure. This risk should be weighed against the cost of the application to determine whether a fungicide should be applied.

Test 8: Insecticidal Seed Treatment Trial

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 20, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 28 seeds per row foot
Variety: Roane

Introduction

Seed treatments with activity in controlling insect pests are new to the wheat seed industry. These treatments that include Guacho and Cruiser along with combinations of these insecticides with other treatments like Dividend or Raxil are effective against the common fall insect pests in wheat including aphids and Hessian Fly. Since this field site had

experienced significant levels of aphids in the past, this study was designed to test these new compounds for controlling insects as measured by tiller density and yield.

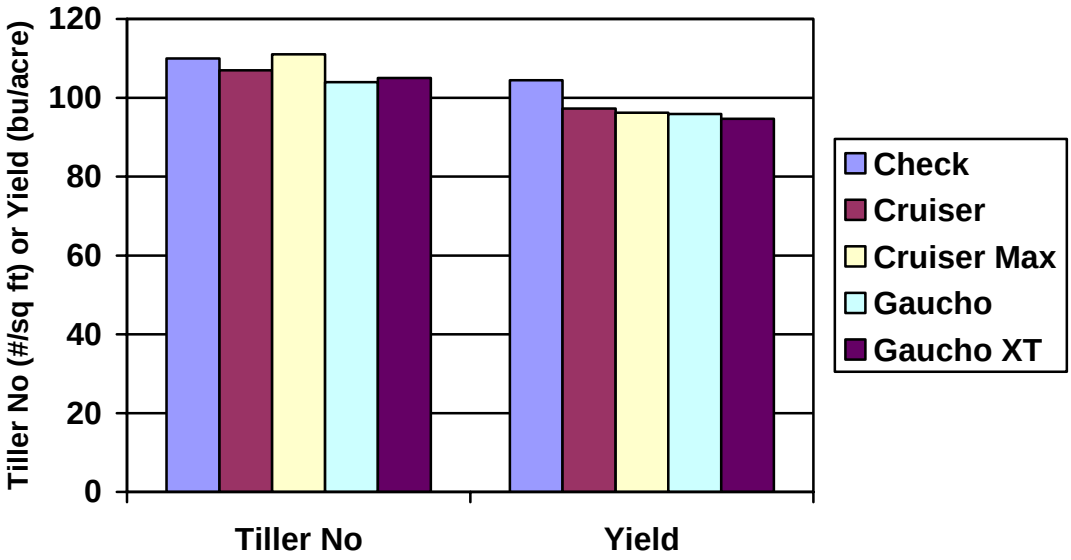


Fig. 6. Tiller number and yield response to four different insecticidal seed treatments at the White Hat Seed Farm. No significant differences were found among the treatments for either tiller number or yield.

Conclusions

No significant insect infestation was noted in the plots in this trial (Fig. 6). As with the fungicide trial, it should be no surprise that none of the treatments applied resulted in increased tiller density or yield.

Test 9: Nitrogen Rate and Timing Trial

Cooperator: White Hat Seed Farm Location: (See Map)
Planting Date: Oct. 20, 2005 Tillage: Conventional
Row Spacing: 6 2/3" Seeding Depth: 1.5" Seeding Rate: 28 seeds per row foot
Variety: Coker 9804

Introduction

Increasing prices for nitrogen fertilizer lead to higher costs and lower profits for wheat growers. Since high-yielding wheat requires N it is critical that the grower become more efficient in the use of N. Nitrogen use efficiency is primarily related to timely applications of proper rates of N fertilizer. This study was designed to re-examine the use of N fertilizer in wheat production. Three application strategies were tested: early application (Feb. 2) at GS 25 stage, late application (Mar. 6) at the GS 30 stage and a split application with different rates applied both on Feb 2 and Mar. 6. Application rates ranging from 0 to 180 lbs of N per acre were tested under each of these three strategies. Figure 7 shows the results of this test.

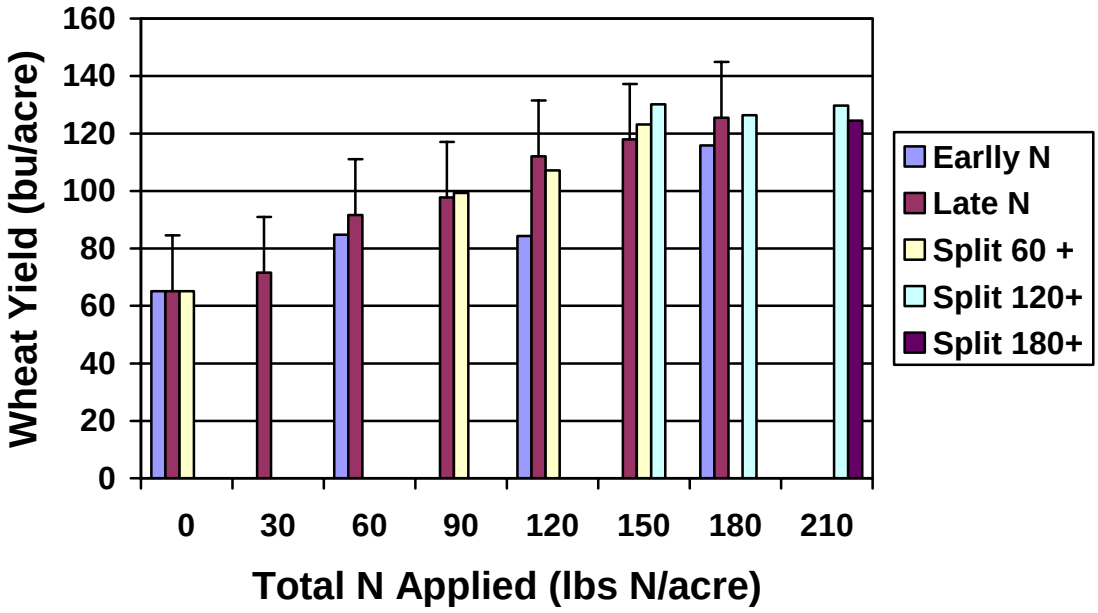


Fig. 7. Wheat yield response to increasing rates of nitrogen applied at two different dates (Feb 2 and Mar 6) in different combinations. LSD @ $p < 0.05$ = 19.4 bu/acre

Conclusions

Wheat yield increased with increasing amounts of N applied until reaching a maximum at ~123 bu/acre when 150 lbs of N was applied. Further increases in N did not increase yield. The lowest rate that could be applied without a significant difference with the highest recorded yield was 120 lbs of N per acre applied at GS30. Similar results could have been obtained by a split application of 60 lbs of N early followed by 60 lbs of N late. A single early application always had lower yields compared to a single late or split application and there was a significant yield difference between the early and late application when 120 lbs of was applied. This study indicates that early applications of N will not be as efficient in terms of N use compared to late or split applications. In this case, tiller density was above 60 tillers per square foot and the early application of N was not necessary. In situations where tiller density is below the threshold of 50 tillers per square foot growers will need to consider a split application of N to enhance tiller development. Growers should either consider splitting N or making a single late N application to contain costs while increasing N use efficiency.

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